

US-PAT-NO: 4593974 DOCUMENT-IDENTIFIER: US 4593974 A

TITLE: Plastic optical fiber

Brief Summary Text - BSTX (5):

Improvements in the light transmission properties of optical fibers have led to their increased use in the fields of optical communication and the like. Conventional optical fibers which have been developed hitherto include those having a core consisting of a glass and those having a core consisting of a plastic material. Conventional glass core optical fibers exhibit excellent light transmission properties, and, therefore, are useful in the field of long-distance communication. However, this type of optical fiber exhibits poor flexibility and, therefore, easily breaks. Accordingly, these optical fibers cannot be advantageously used in the field of short-distance communication, wherein a high-order fabrication is necessary. Plastic core optical fibers, on the other hand, can transmit light only a relatively short distance. However, this type of optical fiber exhibits excellent flexibility and, thus, is very useful in the field of short-distance communication.

Brief Summary Text - BSTX (6):

Conventional plastic core optical fibers which have been developed hitherto are mainly of a step-index type. A step-index type optical fiber is composed of a core comprising a polymer of a high refractive index and a cladding layer comprising a polymer of a low refractive index. When light is applied to the step-index type optical fiber, the light is transmitted through the core while being reflected entirely on the interface between the core and the cladding layer. Therefore, the important requisites for the optical fiber are that the cladding layer be firmly bonded to the core and that the cladding layer be highly resistant to the formation of cracks therein.

Brief Summary Text - BSTX (8):

An optical fiber comprising a core consisting of polystyrene and a cladding layer consisting of polymethyl methacrylate is already known in Japanese Examined Patent Publication (Kokoku) No. 43-8978. The bonding property of polystyrene to **polymethyl methacrylate**, however, is unsatisfactory. Therefore, the resultant optical fiber has unsatisfactory optical properties at the interface between the core and the cladding layer. On the other hand, there are known several references concerning an optical plastic fiber comprising a core consisting of polymethyl methacrylate exhibiting a high transparency and a cladding layer consisting of a fluorine -containing polymer.

US-PAT-NO: 6356675

DOCUMENT-IDENTIFIER: US 6356675 B1

TITLE: Fiber optic refractive index monitor

Those prior art devices that rely on multiple bend waveguides or abrasions for their operation are so constructed because the materials typically available for optical fibers, particularly plastic, have refractive indices considerably higher than the surrounding liquid to be monitored. Plastic has been emphasized for a variety of commercial applications because it is ductile and inexpensive. However, a typical plastic core of polymethyl methacrylate (PMMA) has a refractive index of 1.492. The fluorine-doped cladding of these fibers is about 1.417. If a straight length of such a sensor fiber is immersed in battery acid (where the liquid being sensed provides the cladding), the minimum light guiding capability (or numerical aperture) of the liquid-clad plastic sensor is so much higher than that of the fibers leading to it that the sensor fiber will guide all of the light entering it regardless of the value of refractive index of the surrounding liquid. Consequently, prior art straight sensors without bends or abrasions are totally insensitive to small changes in refractive index of surrounding liquids having refractive indices below 1.417.